What is claimed is:

1. A detection apparatus for the optical detection of an object comprising

   - detection means, which can detect the light emerging from the object;

   - at least one imaging unit comprising

     - first lens means having a plurality of lens elements arranged in the form of an array, through which light emerging from the object can pass;

     - second lens means, which are arranged between the first lens means and the detection means and can feed the light that has passed through the lens elements to the detection means;

   wherein the second lens means have a plurality of lens elements arranged in the form of an array, and wherein the lens elements of the first and/or of the second lens means have, at least in sections, a cylinder geometry or a cylinder-like geometry.

2. The detection apparatus as claimed in claim 1, wherein the light that has passed through one of the lens elements of the first lens means essentially passes through precisely one of the lens elements of the second lens means.

3. The detection apparatus as claimed in claim 1, wherein the lens elements of the first and/or of the second lens means are in each case formed by at least two cylindrical lenses or cylinder-like lenses, the cylinder axes of said cylindrical lenses or cylinder-like lenses preferably forming an angle of 90° with one another.

4. The detection apparatus as claimed in claim 1, wherein the detection apparatus furthermore comprises scanning means by means of which the at least one imaging unit can be displaced with respect to the object and/or with respect to the detection means in at least one scanning direction.

5. The detection apparatus as claimed in claim 4, wherein the direction in which the lens elements of the first and/or of the second lens means are arranged next to one another in an array forms an angle not equal to 0° and/or 90° with the at least one scanning direction.

6. The detection apparatus as claimed in claim 1, wherein the detection apparatus comprises at least one first imaging unit and at least one second imaging unit.

7. The detection apparatus as claimed in claim 6, wherein the at least one first imaging unit has a resolution which differs from the resolution of the at least one second imaging unit.

8. The detection apparatus as claimed in claim 7, wherein the at least one first imaging unit has a higher resolution in a first direction (X) than in a second direction (Y) perpendicular thereto, whereas the at least one second imaging unit has a higher resolution in the second direction (Y) than in the first direction (X) perpendicular thereto.

9. The detection apparatus as claimed in claim 8, wherein the resolution of the at least one imaging unit can be varied, in particular can be varied differently in two mutually perpendicular directions (X, Y).

10. The detection apparatus as claimed in claim 1, wherein at least some of the lens elements of the first and/or of the second lens means comprise at least two parts.

11. The detection apparatus as claimed in claim 10, wherein the lens elements comprising at least two parts can split the light that emerges from a point of the object and impinges on them into two partial beams in such a way that the points of impingement of said partial beams on the detection means can provide information about the position of the point in a direction (Z) perpendicular to the surface of the object.

12. The detection apparatus as claimed in claim 4, wherein the scanning means are configured in such a way that, in a first scanning position, the light emerging from a point of the object impinges on a first point of impingement on the detection means, and that, in a second scanning position, the light emerging from the same point of the object impinges on a second point of impingement - at a distance from the first point of impingement - on the detection means, the points of impingement being able to provide information about the position of the point in a direction (Z) perpendicular to the surface of the object.

13. A detection apparatus for the optical detection of an object comprising

- detection means, which can detect the light emerging from the object;

- at least one imaging unit comprising

  - first lens means having a plurality of lens elements arranged in the form of an array, through which light emerging from the object can pass;

  - second lens means, which are arranged between the first lens means and the detection means and can feed the light that has passed through the lens elements to the detection means;

wherein the second lens means have a plurality of lens elements arranged in the form of an array, and wherein the lens elements of the first and/or of the second lens means are in each case formed by at least two cylindrical lenses or cylinder-like lenses, the cylinder axes of said cylindrical lenses or cylinder-like lenses preferably forming an angle of 90° with one another and wherein the detection apparatus furthermore comprises scanning means by means of which the at least one imaging unit can be displaced with respect to the object and/or with respect to the detection means in at least one scanning direction.

14. A method for operating a detection apparatus as claimed in claim 1, wherein, in a first method step, an object is imaged onto the detection means by a first imaging unit, which is displaced with respect to the object in the scanning direction, and wherein, in a second method step, the object is imaged onto the detection means by a second imaging unit, which is displaced with respect to the object in the same scanning direction.

15. The method as claimed in claim 14 wherein the imagings by the first imaging unit and by the second imaging unit are carried out with different resolutions.

16. The method as claimed in claim 14, wherein the imagings by the first imaging unit and by the second imaging unit are carried out with different resolutions in mutually perpendicular directions, the first imaging unit achieving a higher-resolution imaging in a first direction (X) and the second imaging unit achieving a higher-resolution imaging in the second direction (Y) perpendicular thereto.

17. The method as claimed in claim 14, wherein the image information items which are recorded successively by the detection means with the two imaging units are combined with one another in order to obtain a high-resolution image of the object.

18. A scanning apparatus, featuring a detection apparatus as claimed in claim 1.

19. A confocal microscope, featuring a detection apparatus as claimed in claim 1.